USING BODY SURFACES FOR PLACING AUGMENTED REALITY CONTENT

BACKGROUND

The widespread adoption of portable computing devices, such as smartphones and tablet computers, has resulted in a corresponding increase in the amount and types of electronic content available to users. This includes the providing of augmented reality (AR) content, where image data can be captured for a location and a computing device can render content such that the content appears, at least as displayed on a screen of the device, that the content exists in that physical location. In many situations the device performing the rendering will attempt to determine an appropriate surface or object to use as a location for displaying the AR content. There will not always be appropriate surfaces or objects available, and displaying AR content at a distance from physical objects or surfaces detracts from the perceived realism of the augmented reality experience.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments in accordance with the present disclosure will be described with reference to the drawings, in which:

FIGS. **1**A, **1**B, and **1**C illustrate approaches for displaying augmented reality content that can be utilized in accordance with various embodiments.

FIGS. **2**A, **2**B, **2**C, **2**D, **2**E, and **2**F illustrate example approaches for displaying augmented reality content with respect to a body part of a user that can be utilized in accordance with various embodiments.

FIGS. **3**A, **3**B, **3**C, and **3**D illustrate an example approaches to enabling a user to interact with augmented reality content rendered with respect to a body part of the user that can be utilized in accordance with various embodiments.

FIGS. **4**A, **4**B, **4**C, and **4**D illustrate an example approach to rendering augmented reality content that can be utilized in accordance with various embodiments.

FIG. **5** illustrates an example system that can be used to render AR content relative to detected body parts that can be utilized in accordance with various embodiments.

FIG. **6** illustrates an example environment in which various embodiments can be implemented.

FIG. **7** illustrates an example gaming pipeline that can be used in accordance with various embodiments.

FIG. **8** illustrates an example process for projecting AR content on a body part of a user that can be utilized in accordance with various embodiments.

FIG. **9** illustrates an example process determining AR content to display based on a type and orientation of a determined body part that can be utilized in accordance with various embodiments.

FIG. **10** illustrates an example process for changing a display of AR content based on a type of determined movement of a body part of a user that can be utilized in accordance with various embodiments.

FIG. **11** illustrates an example computing device that can execute an augmented reality application in accordance with various embodiments.

FIG. **12** illustrates example components of a computing device that can be used to implement aspects of the various embodiments.

DETAILED DESCRIPTION

In the following description, various embodiments will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the embodiments. However, it will also be apparent to one skilled in the art that the embodiments may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the embodiment being described.

Approaches in accordance with various embodiments provide for the presentation of dynamically rendered content, such as augmented reality (AR) or virtual reality (VR) content. In particular, various approaches provide for the dynamic projection of AR content onto portions or parts of a user's body. When determining position data for rendering AR content, a device will often capture image data of the surrounding scene, including visible objects and other visual aspects of the environment. This image data can be used to detect body parts brought within an augmented reality view, such as when a user moves his or her hand in front of a camera capturing the image data for the AR application. A type of content to be displayed can be determined based not only on the location and orientation of the device in an augmented reality session, for example, but also on the type of body part and the relative orientation of that body part. For example, a first type of content might be projected onto the user's right palm, and a second type projected onto the back of the user's right hand when visible to the AR application. The content might also change with changes in the orientation of the body part or motion to cause another body part to be visible. Various motions or gestures can cause the content to change as well. A user can make a selection or input for the content by contacting the surface of the body part onto which the content is projected. The contact provides tactile feedback to the user, as well as a determinable action for the device. The type of contact can be used, along with the corresponding AR content for the contact location, to determine an action or input for the AR application.

Various other functions can be implemented within the various embodiments as well as discussed and suggested elsewhere herein.

There can be various situations where it may be desirable to render or provide augmented reality (AR) content to one or more viewers through one or more electronic devices. As known for AR content, the view and content displayed on each device can be a function of the location of the device in at least some embodiments, as well as the orientation (or changes in orientation) of the device. This enables each device to function as an augmented window on the world, where the augmented content will appear to exist in the real world when viewed through the display of the device, typically laid over a live camera view. The scale, angle, and location of the augmented content can move as appropriate with the change in location and/or orientation of the computing device.

There are various challenges in rendering AR content in various random locations. For example, to provide a sense of realism it is often desirable to render the AR content to appear to be in contact with, or at least positioned relative to, a physical object visible in the surrounding scene. It will often be the case, however, that there is no physical surface visible that is of the appropriate size, orientation, and relative location, and that is further free of obstructions or other issues when attempting to render the relevant AR content. Further, even when the AR content is rendered relative to a view of a physical object there are challenges in a user interacting with the AR content. For example, a user might want to select an item from a list displayed over a view of a table. The user would have to make a determined